

Claims

[c1] What is claimed is:

1.A liquid crystal display device comprising:

a liquid crystal display panel having two parallel substrates and a liquid crystal layer sealed between the substrates;

a light source for generating light beams; and

a dispersion film positioned between the liquid crystal display panel and the light source having a plurality of bar-like structures arranged along a first direction and facing the light source;

wherein the dispersion film is utilized for enabling brightness of the light beams generated from the light source to be increased when a viewing angle is increased, and further utilized for enabling the liquid crystal display device to display an image with uniform brightness.

[c2] 2.The liquid crystal display device of claim 1 further comprising a first diffuser positioned between the dispersion film and the liquid crystal display panel for uniformly distributing light beams that pass through the dispersion film.

- [c3] 3.The liquid crystal display device of claim 1 wherein the dispersion film is a second diffuser.
- [c4] 4.The liquid crystal display device of claim 1 further comprising a light-guiding plate positioned between the light source and the dispersion film for guiding the light beams generated by the light source, a third diffuser positioned between the light-guiding plate and the dispersion film for uniformly distributing the light beams, and a reflective plate positioned under the light-guiding plate for reflecting light beams into the liquid crystal display panel.
- [c5] 5.The liquid crystal display device of claim 1 wherein a cross section of each of the bar-like structures along a second direction that is perpendicular to the first direction has a shape of a triangle.
- [c6] 6.The liquid crystal display device of claim 1 wherein a cross section of each of the bar-like structures along a second direction that is perpendicular to the first direction has a shape of a trapezoid.
- [c7] 7.The liquid crystal display device of claim 6 wherein two adjacent trapezoids among the trapezoids are separated by a round depression.

- [c8] 8.The liquid crystal display device of claim 1 wherein a cross section of each of the bar-like structures along a second direction that is perpendicular to the first direction has a shape of a semicircle.
- [c9] 9.The liquid crystal display device of claim 1 wherein each of the bar-like structures comprises a linear structure, a bent structure, or a wavy structure.
- [c10] 10.The liquid crystal display device of claim 1 wherein the dispersion film comprises a plastic film.
- [c11] 11.A liquid crystal display device comprising:
a liquid crystal display panel having two parallel substrates and a liquid crystal layer sealed between the substrates;
a light source for generating light beams;
a first dispersion film positioned between the liquid crystal display panel and the light source having a plurality of first bar-like structures arranged along a first direction and facing the light source; and
a second dispersion film positioned between the first dispersion film and the light source having a plurality of second bar-like structures arranged along a second direction and facing the light source;
wherein the first direction is approximately perpendicular to the second direction, and the first dispersion film

and the second dispersion film are utilized for enabling brightness of the light beams generated from the light source to be increased when a viewing angle is increased and further utilized for enabling the liquid crystal display device to display an image with uniform brightness.

[c12] 12.The liquid crystal display device of claim 11 wherein a cross section of each of the first bar-like structures along the second direction comprises a shape of a triangle, a trapezoid, or a semicircle.

[c13] 13.The liquid crystal display device of claim 11 wherein a cross section of each of the second bar-like structures along the first direction comprises a shape of a triangle, a trapezoid, or a semicircle.

[c14] 14.The liquid crystal display device of claim 11 wherein each of the first bar-like structures and the second bar-like structures comprises a linear structure, a bent structure, or a wavy structure.

[c15] 15.The liquid crystal display device of claim 11 further comprising a light-guiding plate positioned between the light source and the second dispersion film for guiding the light beams generated by the light source, a diffuser positioned between the light-guiding plate and the second dispersion film for uniformly distributing the light

beams, and a reflective plate positioned under the light-guiding plate for reflecting light beams into the liquid crystal display panel.

[c16] 16.The liquid crystal display device of claim 11 wherein each of the first dispersion film and the second dispersion film comprises a plastic film.

[c17] 17.A liquid crystal display device comprising:
a liquid crystal display panel having two parallel substrates and a liquid crystal layer sealed between the substrates;
a light source for generating light beams; and
a dispersion film positioned between the liquid crystal display panel and the light source having a plurality of pyramid structures facing the light source;
wherein the dispersion film is utilized for enabling brightness of the light beams generated from the light source to be increased when a viewing angle is increased, and further utilized for enabling the liquid crystal display device to display an image with uniform brightness.

[c18] 18.The liquid crystal display device of claim 17 wherein the dispersion film comprises a plastic film.

[c19] 19.The liquid crystal display device of claim 17 wherein

the pyramid structures are arranged in a matrix.

[c20] 20. The liquid crystal display device of claim 17 further comprising a light-guiding plate positioned between the light source and the dispersion film for guiding the light beams generated by the light source, a third diffuser positioned between the light-guiding plate and the dispersion film for uniformly distributing the light beams, and a reflective plate positioned under the light-guiding plate for reflecting light beams into the liquid crystal display panel.